CLAIMS

1. An exposure apparatus, comprising a projection optical system which projects and transfers a pattern formed on a mask onto a substrate, and a substrate stage, positioned below said projection optical system, which while holding said substrate moves in directions substantially perpendicular to the direction of the optical axis of said projection optical system, comprising:

a detector, positioned on a periphery of said projection optical system, which detects the position of said substrate stage or of said substrate along said optical axis direction; and

a control device, which halts or reverses movement of said substrate stage based on the result of detection by said detector.

2. The exposure apparatus according to claim 1, further comprising an elevating device which moves said substrate stage in said optical axis direction,

wherein said control device operates said elevating device based on detection results of said detector to move said substrate stage away from said projection optical system along said optical axis direction.

3. The exposure apparatus according to claim 2, wherein said detector is positioned in a plurality of positions, at greater distances from said projection optical system in directions substantially perpendicular to said optical axis direction than the stopping distance of said substrate stage.

4. The exposure apparatus according to claim 1, further comprising an vibration isolation device which supports said projection optical system while preventing vibrations, movably along said optical axis direction,

wherein said control device operates said vibration isolation device to raise said projection optical system in said optical axis direction, based on detection results of said detector.

5. The exposure apparatus according to claim 1, further comprising a second vibration isolation device which supports said substrate stage while preventing vibrations, movably along said optical axis direction,

wherein said control device operates said second vibration isolation device to lower said substrate stage in said optical axis direction, based on detection results of said detector.

6. An exposure apparatus, comprising:

a projection optical system which projects and transfers a pattern formed on a mask onto a substrate, and a substrate stage, positioned below said projection optical system, which while holding said substrate moves in directions substantially perpendicular to the direction of the optical axis of said projection optical system, comprising:

a detector, positioned on a periphery of said projection optical system, which detects the position of said substrate stage or of said substrate along said optical axis direction;

an vibration isolation device, which supports said projection optical system so as to prevent vibrations, movably along said optical axis direction;

a second vibration isolation device, which supports said substrate stage so as to prevent vibrations, movably along said optical axis direction; and

a control device, which, based on detection results of said detector, controls at least one of said vibration isolation device and said second vibration isolation device to move said substrate stage and said projection optical system, or said substrate and said projection optical system, along said optical axis direction.

7. An exposure apparatus, in which the space between a projection optical system which projects a pattern onto an object and an object placed on the image-plane side of said projection optical system is filled with a liquid, and exposure to said pattern is performed through the liquid, comprising:

an opposing member, positioned apart from said object in the direction of the optical axis of said projection optical system; and

a control device, which, in response to notification of occurrence of an abnormality, moves said object and said opposing member apart along said optical axis direction.

8. The exposure apparatus according to claim 7, wherein said control device, in response to notification of occurrence of an earthquake, moves said object and said opposing member apart along said optical axis direction.

9. The exposure apparatus according to claim 8, wherein said object is movable within the plane perpendicular to said optical axis, and said control device, in response to notification of abnormal operation of said object, moves said object and said opposing member apart along said optical axis direction.

10. The exposure apparatus according to claim 8 or 9, further comprising an elevating device which moves said object in said optical axis direction and a driving device which drives said opposing member in said optical axis direction,

wherein said control device controls at least one of said elevating device and said driving device to move apart said object and said opposing member along said optical axis direction.

11. The exposure apparatus according to claim 10, further comprising a first frame which supports said opposing member, and wherein said driving device is an vibration isolation device which supports said opposing member, movably in said optical axis direction, through said first frame.

12. The exposure apparatus according to claim 11, further comprising a second vibration isolation device which supports said object movably along said optical axis direction,

wherein said control device controls at least one of said elevating device, said vibration isolation device, and said second vibration isolation device to move apart said object and said opposing member along said optical axis direction.

13. The exposure apparatus according to claim 10, wherein said driving device drives said opposing member, relative to said projection optical system, in said optical axis direction.

14. The exposure apparatus according to claim 7, wherein said object is a substrate for exposure to said pattern or a substrate stage holding said substrate, and movable with at least three degrees of freedom.

15. The exposure apparatus according to claim 7, wherein said opposing member comprises at least one of a liquid supply device which supplies liquid to the space between said projection optical system and said object, and a liquid recovery device which recovers said liquid.

16. A device manufacturing method, comprising a lithography process, wherein in said lithography process, an exposure apparatus according to any one of Claims 1 through 15 is used.